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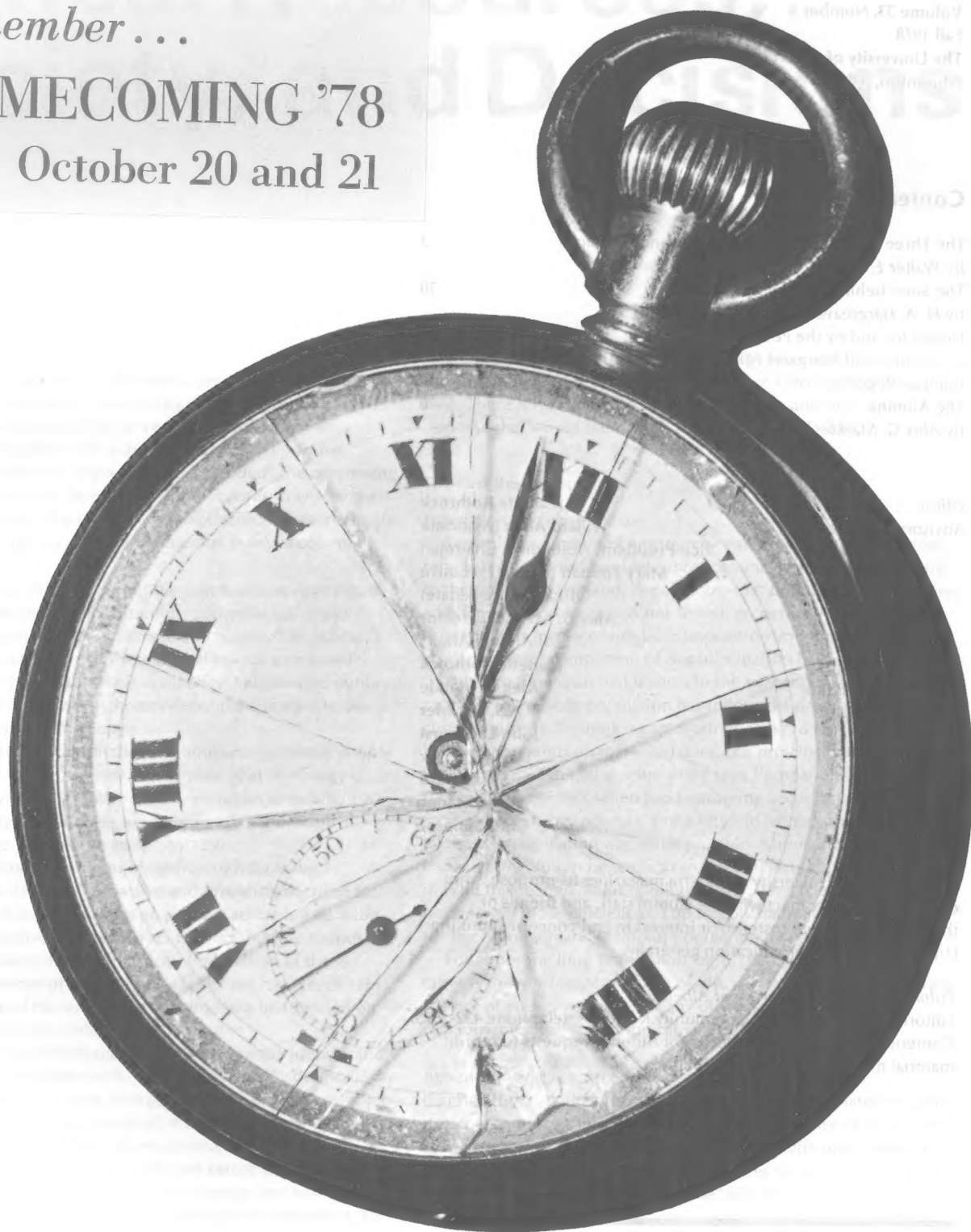
new trail

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Remember . . .

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The Three Critical Resources, Society, and Decisions

by W.E. Harris

Society has yet to comprehend the magnitude of the importance of the three critical resources—time, energy, and intelligence. Our future depends on them and the far-reaching significance of decisions concerning them. For a decade society's support for development of intellectual capital has been eroded. The continuing raid on our fossil fuels can be justified only if it leads to ensuring a long-term energy base. The time for making decisions is increasingly compressed as population grows and magnifies every problem.

Partly because I am a chemist, during the past twenty-five years a side interest of mine has been an attempt to identify the world's most critical resources and their demand and supply. The public should be clearly aware of what these critical resources are and should know something about their availability. Enlightened public support is essential if the wisest choices about their use are to be made among the options now open.

Today we hear continuing discussion about energy. Many people have suddenly discovered, to their amazement, that an energy crisis is imminent. Yet even in 1950, with an extrapolation of trends, it was clear that an energy problem was not far off and that disruptive effects probably would begin to be felt by 1980.

All members of society have an obligation to help make intelligent, realistic decisions. A passive and unwitting decision to continue without change or to take no positive action is a decision just as surely as an active one. Not to act is to act. But the soundest decisions will be reached only after careful evaluation of the probable consequences of choosing to take, or not to take, certain courses of action, and the soundest decisions must be founded on an adequate and objective information base.

The first item in our information base should be the identification of the truly critical resources (with "resources" broadly defined): my conclusion is that they are *time*, *energy* and *intelligence*. To grapple with a political, economic, sociological, ethical, engineering, or almost any other problem, these three are vital. Each of them is critical in every nation, and only to a limited extent can two be substituted for the third: by spending extra energy and having extra time, a country might get by with less intellectual development. For

example, Israel, a country of limited energy resources, has compensated in part by the development of a strong intellectual base. There is no substitute for time, however, and time is the resource that would seem to be running out the fastest.

The First Resource: Time

Population and resource use

In general, the amount of a resource required (human or material, renewable or nonrenewable) is proportional to the population and to the per capita demand. We all know that population is increasing with time, but probably it is not so well recognized that per capita requirements increase with both population and time. This trend is an all-pervasive component of our information base.

During a time span that is short in the existence of the human race, the increase in population has followed a dramatically steep curve (Figure 1). To think it can continue upward for long is folly; how long depends on many variables, but principally on how much food can be produced at a sustained rate. Population was small until some 8,000 years ago, when food-gathering societies began changing to food-producing societies, and a fiftyfold to one-hundredfold increase in population was made possible. About 200 years ago the industrial revolution began, and we are still just in the beginning of it. With this second major revolution in society, food production became still more efficient and up to now has made possible a further (approximately tenfold) population increase.

For either the long or the short term, *the population growth curve is the most important fact of life*, whether we are considering the use of energy resources or any other political, economic, religious, medical, technological, or scientific problem.

Agriculture and resource use

If agriculture is defined broadly to include all food-related activities, no other industry can come close to it as a consumer of resources. A wide range of data from well-based studies is difficult to procure. One thorough study (Pimentel, 1973) relates to corn production in the United States. (Corn is one of the "big three" cereals, along with wheat and rice.) In this study, costs were converted to a uniform

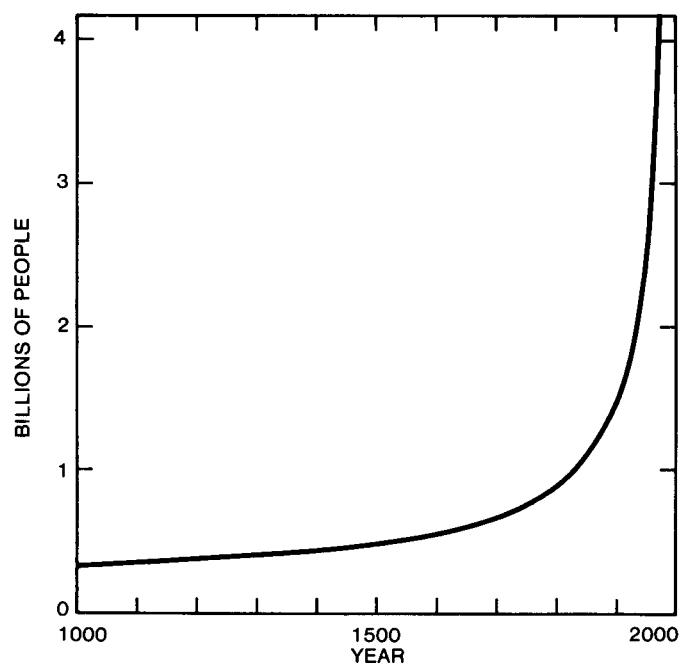


Figure 1. Population growth curve for the last 1,000 years.

basis, not in terms of dollars but in terms of calories per acre for the various resources used. Table 1 is an excerpt from the data covering the period 1945 to 1970. The amount of fertilizer used increased more than tenfold, with a higher level of industrialization required for its manufacture; machinery was up—again more industrialization; and so on. Except for labor, virtually all the resources involved are nonrenewable and require more industrialization. As a result of the increased use of nonrenewable resources, the yield more than doubled: in terms of megacalories per acre in 1945 and in 1970, the output was 3,430 and 8,160. The really significant matter, however, is that the output-input ratio decreased; that is, the increased yield was less than proportional to the increased energy input, or fewer bushels of corn per calorie input.

The study that produced these data told only part of the story of how industrialization makes possible more food for more people. Nothing was included for housing and clothing of the farmer, the food processors, or their dependents. No allowance was made for

road building to haul the fertilizer to the farm and the corn away from it; these require machinery and fuel and raw materials. For all the machines needed, iron ore must be mined and a steel industry maintained. For the gasoline we must have petroleum refineries; for the electricity, power plants. When the people associated with these various activities fall ill, they want hospitals and medical attention. Obviously, then, if we all wish to eat every day, in addition to farms we must have mines, refineries, chemical plants, power plants, transportation facilities, and so on.

Use patterns for nonrenewable resources

Consider more closely the matter of machinery. To produce machinery, we need iron, copper, lead, zinc, tin, sulphur, limestone, and so on. The most important item is iron, the backbone of an industrial society. There is no substitute for it. Another essential piece of information, then, is how much of such nonrenewable resources is needed.

In 1950 the quantity of iron products used in the United States required the production of about 1,300 pounds of new iron per person per year. That amount has increased each year, and now the estimate is about 1,550 pounds per person. Thus, the impact on iron resources in 1975 compared with 1950 is such that, for every pound used in 1950, 1.6 pounds are now required—a figure that takes into account both the increasing population and the increasing per capita factor.

Huge deposits of high-grade iron ore still exist, but they will not last forever. The huge Mesabi iron ore deposit in northern Minnesota, for example, has largely been used up. In the Lake Superior region a widespread rock formation known as taconite contains about 30 percent iron. When supplies of taconite run out, ores containing less than 30 percent of this geochemically abundant element can be considered (Skinner, 1976). Although in principle they can be exploited, more energy per ton of iron produced must be expended, and usually more complicated processes have to be worked out. To produce a ton of iron from 30 percent ore requires more than twice as much energy as from 60 percent ore.

Underlying any consideration of reserves of iron is the fact that the world's rate of usage increases exponentially faster than population (the per capita factor again). No insurmountable technological obstacles are apparent for the production of increasing amounts of iron for an increasing population; but long before the world as a whole becomes industrialized, the richest iron resources that can be easily mined and processed will have been exhausted. More energy will be required then to recover iron from lower-grade ores, time will be needed to develop the processes and build the facilities, and intellectual resources will need to be applied to develop and operate the new processes.

For the production of food for a large and increasing population, other vital nonrenewable resources are not all equally critical; for example, we shall not run out of nitrogen as soon as we shall run out of copper, which is difficult to replace in such machines as transformers and transmitting devices. Vanishing reserves for this geochemically scarce element may be a formidable barrier to world development. Figure 2 shows estimated world usage rates for several typical nonrenewable resources during the past seventy-five years and gives reasonable projections of anticipated demands for the rest of this century; in all these examples the curve representing the increase in usage rises more steeply than the curve representing population growth.

We can, then, continue to obtain iron by having enough time to

Table 1. Energy costs of corn production in the United States (Pimentel, 1973) in megacalories per acre.

Resource	1945	1970
Fertilizer	75	1,060
Machinery	180	420
Gasoline	540	800
Electricity	32	310
Drying	10	120
Transportation	20	70
Insecticides	50	120
Labor	12	5
Corn Output	3,430	8,160

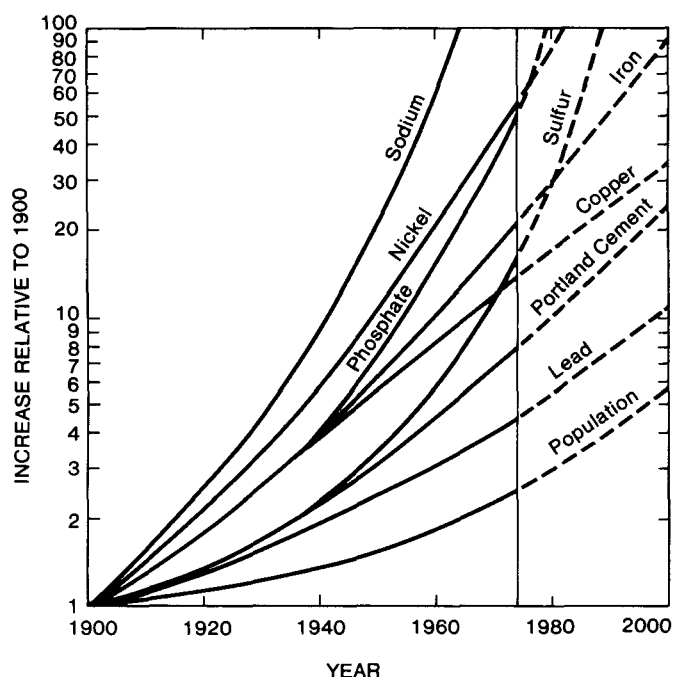


Figure 2. Trends in world resource use compared with population growth rate. (Comparing with Figure 1, note the time axis here of 100 years and the exponential scale.)

develop the appropriate processes, allocating enough of our intellectual resources to their development and operation, and spending the energy required. We can continue to obtain copper, lead, zinc, sulfur, and nickel by developing the processes, having enough time, and spending the energy. Similarly, with enough time to develop the techniques, with the application of intelligence to the development of processes, and with enough energy, we can control insect damage, have all the pure water we need, manage sewage and waste disposal, and improve transportation systems.

The Second Critical Resource: Energy

How much energy has the world been using? How is energy obtained? What are the sources of energy? How much is needed? How much is available? How much time do we have for making critical decisions and taking essential actions? Estimates (Brown, 1952) of total world energy use for the last twenty centuries show the same trend (Figure 3) as for the nonrenewable resources shown in Figure 2. For each recent population increase of 10 percent the need for energy has increased about 20 percent. If the developing nations industrialize more quickly than estimated, the energy projection shown for the next two decades is too low. If they falter and other nations join them, then the projection is probably too high.

Energy economics

Figure 4 illustrates how useful energy is obtained from an energy resource. Note that it must be upgraded with an energy subsidy. This subsidy is a required input from the same or another energy resource, and includes energy expenditures for exploration, buildings, mining, research, roads, maintenance, current processing, and so forth.

When considering unavailable energy, it is necessary to be aware of the first and second laws of thermodynamics. The first law is

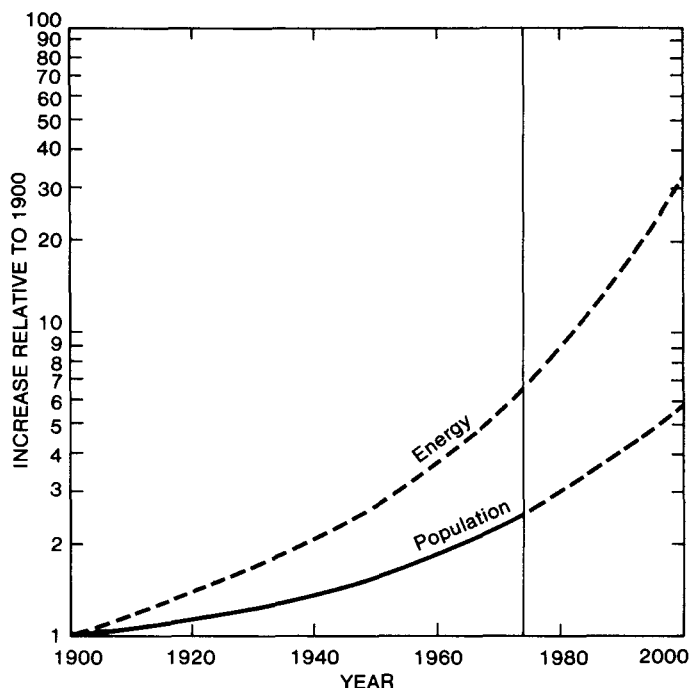


Figure 3. Trends in world energy use compared with population growth rate.

instinctively reasonable. It can be stated simply: "You cannot get something for nothing." There always have been, however, and undoubtedly will continue to be a few who think that this law can be violated and actively work in the belief that they will find a way.

The second (entropy) law is not so obvious. It can be stated, in grossly simplified form: "You cannot break even." According to this law, thermodynamic losses can never be zero: energy cannot be exchanged without loss. For energy sources of low intensity, the demands of this law cannot be described as anything but brutal.

Proposals have been made, for example, that useful energy be obtained from the water in the Gulf Stream, which is at a substantially higher temperature than the water lying beneath it. If an absolutely perfect process for obtaining energy from Gulf Stream water at 25°C and deeper water at 7°C were devised, a second-law calculation indicates that 94 percent of the energy would be unavailable. Since to obtain energy we have to employ some process, the energy requirements for the process must be added to the thermodynamic losses. Cool water lying beneath the Gulf Stream would require pumping, which in itself would require energy. More broadly, the energy used for exploration, transportation, building, moving materials, and delivery of energy to the user is all part of the unavailable energy. Physical losses and process inefficiencies must also be included here. Furthermore, some of the otherwise available energy must be expended for the management of waste and for ecological requirements including safety. All these would have to come out of the 6 percent of available energy before we could speak of net useful energy from this source.

In general, the more intense the energy source, the more nearly technological developments can minimize the loss; but no situation can be conceived where the thermodynamic losses for a process would be zero.

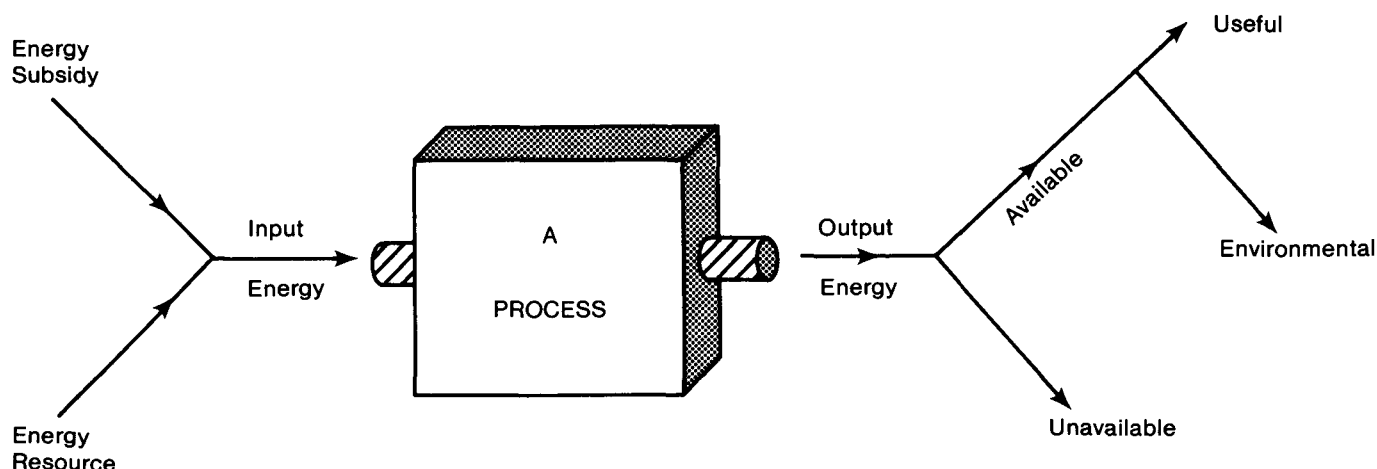


Figure 4. Simplified energy-economics diagram.

For an energy resource to be feasible, a favorable energy balance must be achieved: *the quantity of useful energy must be greater than the subsidy* after a reasonable period of time. Proposals for the exploitation of energy sources should always be evaluated in terms of this requirement.

Sources of energy

Consider next the various sources of energy. They can be classified as renewable or nonrenewable, or as physical, chemical, or nuclear. Physical sources, such as water, sun, wind, and tides, are the most diffuse. For reasonable amounts of power they require large installations and the handling of enormous amounts of materials, and the second law of thermodynamics assumes extreme importance. It can be calculated that one gram of water falling through ten metres can yield 0.025 calorie. Chemical sources of energy are more concentrated. With these sources a chemical reaction takes place, as in combustion in the burning of wood or oil. If one gram of coal is burned, typically about 8,000 calories of energy is released. Nuclear sources of energy are even more concentrated, involving a nuclear rather than a chemical reaction. The fission of one gram of uranium-235 yields about twenty billion calories of energy.

Another question that must be considered is how much total energy is available. Here, judgment and opinion begin to play an increasing role. Renewable energy resources are certainly the most intellectually appealing. Water power is a fine example; it is an important source of energy and will continue to be. At present it carries only about 2 to 3 percent of the total load. New facilities are being installed at a rate less than the rate of increase in energy usage. Accordingly, the 2 to 3 percent is decreasing with time. The contribution of the other developed renewable resources to the energy pool is tiny compared with that of water power. Wood, as an example of a renewable photochemical source of energy, went through its peak on this continent a century ago. The contribution of winds and tides is even smaller, much smaller than that of wood.

The amount of energy received by the earth from the sun is enormous, and it would be pleasant and fortunate if it could carry the energy load. Unfortunately, it is another of the low-intensity sources that has rough going with the second law; it is intermittent even in the daytime, it is widely diffuse, and it requires a large subsidy. The sun should play an increasing role in meeting low-level

needs, such as in the location and design of buildings to take advantage of it as a heat source—a supplementary role to modify or reduce heat requirements from some major energy source.

Taken as a whole, it appears that the renewable energy resources (water, sun, wind, biomass, et cetera) may reasonably contribute 2 to 5 percent of the energy we will require in the future. All these should be used to whatever extent is feasible. But if we compare this contribution with projected increases in energy needs for the future, clearly we must look to the nonrenewable resources—the fossil fuels and nuclear fuels—to be the mainstay for an industrialized society. There is unquestionably more coal than gas and oil still available to mankind, but all these are available only in limited supply—at most for a few decades. The fossil fuels cannot remain the principal energy source much beyond the end of the century, even if it were assumed that those currently alive on the earth have the right to exploit them completely, leaving none for their descendants. (Interestingly, the birth and demise of the fossil fuels as principal sources of energy will have occurred during not much more than a single lifetime.)

The reserves of nuclear fuels are not well established. Probably the equivalent of ten to a hundred times as much energy is available from this source as from fossil fuels; many times more than this would be available with successful development of breeder technology, and enormously more if fusion technology can be developed.

Energy options and time

How much time is necessary to make a conversion from one energy resource to another? Some data on the subject are available. In the United States, wood as the prime energy source was at its maximum in about 1870. Coal then contributed about one-third as much as wood. Wood was gradually replaced by coal, which reached its maximum about 1920 (Hottel, 1971). At that time oil and gas contributed about one-fifth as much as coal. Coal was increasingly replaced by oil and gas, until by 1950 they were more significant than coal. Apparently, then, a period of several decades is necessary to make a conversion after the technology is available and developed.

Fundamental knowledge of the sun and wind as energy sources is now highly developed; no big breakthroughs can be expected (Hottel, 1971). Wind technology was highly developed and used for

windmills, and the knowledge is still available. Neither can research be expected to provide important new knowledge related to solar power. The solar constant has been measured many times, and measuring it a few more thousand times cannot change it. How to construct new houses to take advantage of the sun as a heating supplement has been understood for decades. The limits to be expected in the efficiency of conversion of the sun's energy by way of photosynthesis (Calvin, 1976) or with photovoltaic cells are well established. Largely because of the second law of thermodynamics, solar energy can make only a limited contribution to future energy demands.

Adoption of nuclear power as a source of energy has proceeded at a relatively much faster rate than did the adoption of wood, coal, or oil. Currently, it is contributing about one-fiftieth of the energy demand. For fission reactors, knowledge about nuclear science and technology is highly developed. Nuclear power is both safe and clean. Research is continuing on breeder reactors, and the technology is near to being feasible.

Energy hazards

The information base on the subject of energy should include data on the question of hazards. Comparative data should be assembled concerning the current and future real sources of energy and feasible alternatives. For the present, oil and gas are carrying the major load. For the near-term future, for some parts of the world, coal can carry the major load, and for the longer term, nuclear reactors. Of the three, nuclear reactors clearly have the best safety record. To quote Hammond, "The nuclear industry is, *without exception*, the safest in which to be employed." (Hammond was including all industries, not merely energy industries.) A large amount of data is available on the question of safety and radioactivity and other hazards (Penner, 1974; Rose, 1976; Cohen, 1976).

There is not space to examine the information in sufficient detail here, but the safety comparison for the near future must be between coal and nuclear power. Overall, from mining through waste management, the hazard per energy unit for coal is a hundred to a thousand times higher than for nuclear energy. Hazards in both cases, of course, could be reduced by appropriate expenditures of time, intelligence, and energy.

In spite of the safety record, considerable public speculation continues on the matter of possible hazards of nuclear power reactors. For a new technology, their safety record is highly remarkable. Nevertheless, being new and strange, they raise psychological problems in that people feel uncomfortable about them. There is much casting about for reasons why more time should be spent on study, evidently assuming that the fossil fuels will last for a long time, or hoping that some other energy source will be discovered.

The approximately 2,000 reactor-years of operating experience with power reactors since 1956 has resulted in no operator or public deaths directly attributable to nuclear accident. At the beginning, many failures occurred, some of them extremely serious. The reason they did not result in fatalities relates to the nature of fission reactions and to the construction of a modern reactor: typically sealed fuel rods, a reactor vessel, a containment shell, and an exclusion area. On rare occasions, fuel rods have failed, and costly and tedious clean-up jobs have resulted. Nevertheless, no extraordinary hazard is caused by such failures. There has never been a nuclear accident that has seriously damaged the main vessel

in a power reactor, and certainly none have involved the containment shell. Should such failures occur, there still would be no extraordinary hazard, though the owner would have an extremely costly clean-up job.

Another speculation relates to a nuclear power reactor out of control. Nuclear weapons can only be triggered in surroundings free of neutrons—so-called "clean" surroundings. A nuclear-power assembly constitutes the worst possible environment in which to attempt to trigger an atom bomb. A power reactor has a high level of neutron activity, which would cause an atom bomb to pre-ignite and shut itself off by thermal expansion. A nuclear power reactor *cannot* become an atom bomb.

Another question relates to the management of nuclear waste. In this connection, bear in mind that nuclear reactions are intense sources of energy and, accordingly, the amount of garbage is small. Although care is certainly needed in managing the wastes, the relatively tiny volume reduces the magnitude of the problem (Cohen, 1976). Another important factor in monitoring and controlling the garbage is that radioactivity can be measured billions of times more sensitively than can other hazards; this helps immeasurably in control processes. Overall, the cost of long-term management has been estimated at about one-thousandth the cost of the power produced.

The Third Critical Resource: Intelligence

Of the three critical resources, my main concern is with the intellectual resource base of our nation. The trend in the need for intellectual capital in the world probably increases faster than the population—a comparison with the energy curve of Figure 3 is appropriate.

I believe scientists have two obligations: first, to grapple with the scientific problems that mankind faces; and, second, to be a source of information to assist society in reaching responsible decisions. Whenever a choice is made between alternative courses of action, scientific knowledge and reasoning can and should provide information about predictable consequences. In terms of the energy-economics diagram in Figure 4, society must make decisions at two points, the "subsidy" and "environmental" questions. Although scientists should be a source of information to help lead to responsible evaluations, the actual decisions must lie with others. At these two points, with either insufficient or misleading information—that is, with inadequate intelligence—we can take horrendous political actions that never can be set right. Ignorance is too expensive!

The public may sometimes be perplexed, however, by disagreements among scientists. Scientists act as individuals, and from among the half million on this continent an enterprising reporter could obtain "scientific" support for almost any position, including that the earth is flat. Scientists are sharply stratified in competence—they are not homogeneous and they tend to be apolitical. Societal decisions should be made on the basis of the most reliable information. In scientific matters this will reside in those who are judged by competent colleagues to be currently the most competent *in the area* and those who have evaluated the broad perspective in contrast to a narrow concern. How can the public decide who are the most competent in a particular area? As a first-stage indicator, one should determine whether the scientist in question is listed in an authoritative register of scientists, such as *American Men and Women of Science* (Cattell, 1976). If so, as a second stage, the level of recognition that a scientist has received in

his particular field can be found there in the brief biography. The scientific pronouncements of a third-rate nuclear physicist (biochemist, biologist, et al.) should be given little weight.

With respect to the energy subsidy (Figure 4), as a society we need to make either a decision to spend the resources, particularly energy resources, to convert to a nuclear power base, or a decision not to. We should have information on the probable consequences of acting or failing to act. Similarly, we quickly need to put solar power, which has been speculated about so optimistically, in proper perspective.

The second decision by society relates to the amount of time, energy, and intelligence to spend on environmental effects of energy production and use. Here, professional environmentalists express many valid concerns. Society should decide what is reasonable with respect to management of wastes. Here also the consequences of alternatives should be evaluated with a sense of perspective. Even today, if we look at the overall situation, some compromises are clearly unavoidable. What must be avoided is to allow the population and its requirements to increase to the point where there is no room for proper environmental management.

Energy is vital to our health and safety, and the end of fossil fuels is in sight. If we are to be fed *adequately* in the future, nuclear energy is the most likely to provide the basis for it. Since fossil fuels are “once only” for mankind, the raid currently being perpetrated on them can only be justified if they are used as a base for the development of a feasible long-term energy source (Hoyle, 1977). While we still have fossil fuels to operate with, we should proceed with the establishment of energy from this only feasible source. We can still do it in the nick of time, if we are intelligent enough.

Science and technology

Many outside science are used to being amazed at what science and technology accomplish. They assume that science needs only to be stimulated to perform miracles. Technological optimists appear to exist largely among those who are uninformed about scientific matters. To continue the daydream that science and technology alone can find adequate solutions will force the ultimate reckoning to deal with even larger numbers of people. There must be a fundamental realization of the tragedy of increasing population, and close cooperation is needed among all of us, including those in politics, technology, sociology, religion, economics, and science. Temperance cannot be legislated, yet social attitudes and morality are important components of an attack on tomorrow's problems.

Until now our approach to the energy and population problems has been self-centred and weak. Time, energy, and intelligence have all been squandered. Developing situations have been allowed to reach critical proportions and then have been met by wasteful and extravagant expenditure of intellectual resources and energy. To delay a solution to the energy problem until it becomes even more critical can only result in disaster.

A large and increasing population magnifies the severity of all problems, including that of energy. Knowledge of birth control and the associated technology have been developed to the point where *the population explosion could be completely halted in less than one year*. The continuing rise in the population curve (Figure 1) reflects a gross failure among our political, societal, and religious leaders. The present and, possibly, future populations can be fed, provided we can get the energy needed and develop the techniques for increased food production. Admittedly, the large population was made possible through the agricultural and industrial revolutions;

now it can be sustained only with increasing levels of industrialization. There is no possibility of returning to mythical “good old days.”

My personal conclusion is that enlightened worldwide public support is imperative at two basic and crucial points: first, the highest priority should be given to the application of responsible means for bringing the population under control, and second, the use of nuclear power should be expanded as fast as possible.

The Canadian Context

Canadians, no doubt because they have been generously endowed with natural resources, seem to suffer from complacency. Nevertheless, Canada is confronted with the same kind of problems that have been described more generally in the preceding material; easy long-term solutions are not much more available to Canada than to other parts of the world.

In matters of population growth, we have been in the less responsible half of the world, probably partly because of the mistaken notion that Canada is exempt from the destructive results of continuing expansion of population. Twenty-five years ago when I spoke on the energy-population problem, most people on being asked indicated they thought Canada's population was about right. Since then it has doubled; the curve for Canada has been substantially steeper than that shown in Figure 1. Our government has been among the more backward on matters of official policy on birth control. Yet Canada could have demonstrated leadership in the technology that could have quickly and completely halted world population growth.

In the matter of the three critical resources our record has not been exemplary. The Athabasca Oil Sands have been smugly viewed as a huge, untapped reserve of energy. As a storehouse for chemical raw materials it is indeed large, but as a source of energy it is not. With present technology the energy subsidy (Figure 4) required to recover this oil is appalling; moreover, major technological breakthroughs cannot be expected. When more than a barrel of oil is required to recover a barrel of oil from a source, it is not a source of energy.

Our “once only” oil and gas reserve is being raided with little thought for development of a long-term energy base for future Canadian society. I find it astounding to see recent references to “surplus” gas supplies.

In World War II Canadians had the good fortune to work on the particular area of nuclear science and technology that resulted in probably the best of all systems (Candu) for first-stage nuclear power. For two decades we could have shown real leadership in the development of a nuclear power base. Complacency, however, has been our watchword, and we have squandered irretrievable time.

The energy option I believe to be open to us is to expand the use of coal to help buy some more time and to build a nuclear power base as quickly as possible. I hope that there may be still time for the development of breeder technology as a continuing long-term base for energy.

To plug into knowledge developed around the world we need a high level of development of our own intellectual resources. As in several other places, a decade ago an assault began on this resource, and it still continues.

A special concern of mine is that, in this period of financial restraint, representatives of the government have asked that the needs of Canada for scientific research be “proven.” Such calls for intense scrutiny reinforce the tendency of politicians to concentrate

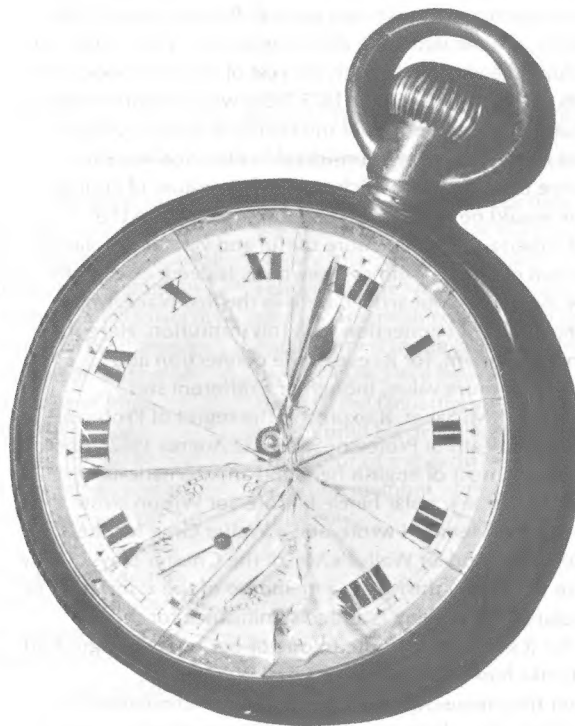
on immediate problems and to defer or ignore the long-term need for intellectual capital. It is fashionable to belittle the value of higher education, to point to unemployed or underemployed PhD's, and to conclude that our intellectual base is sound. In the seventies, government funds for the scientific component of Canada's intellectual resource base have far from kept pace with those of other advanced nations such as the UK, the USA, and France. Canadians have neither the time nor the energy resources to substitute for continuing erosion of their intellectual capital.

To end on a positive note, I believe we can still ensure a long-term future if we hasten to take the right steps. I am not suggesting unknown forms of technology. Acceptable technology is here now to control further population increases. Our long-term energy future cannot be with the fossil fuels, but fortunately the nuclear option is open. We should not squander more time before reaching responsible decisions about our future.

Walter E. Harris, BSc '38, MSc '39, is Chairman of the Department of Chemistry at the University. He joined the department in 1946. He has some eighty scientific publications and three books to his credit. Among the honors he has received are the Fisher Scientific Lecture Award for excellence in analytical chemistry and the Chemical Education Award, both sponsored by the Chemical Institute of Canada. Dr. Harris has also received the Outstanding Achievement Award of the University of Minnesota and has been elected a Fellow of the Royal Society of Canada.

References

- Brown, H.S. (1954) *The Challenge of Man's Future*, Viking Press, New York.
- Calvin, M. (1976) "Photosynthesis as a Resource for Energy and Materials," *American Scientist* 64:270-278.
- Cohen, B.L. (1976) "Impacts of the Nuclear Energy Industry on Human Health and Safety," *American Scientist* 64:550-559.
- Cattell (1976) *American Men and Women of Science*, 13th Ed., Edited by Jacques Cattell Press, R.R. Bowker Co., New York.
- Hottel, H.C., and J.B. Howard (1971) *New Energy Technology—Some Facts and Assessments*, M.I.T. Press, Cambridge, Massachusetts.
- Hoyle, F. (1977) *Ten Faces of the Universe*, W.H. Freeman Co., San Francisco.
- McElroy, W.D. (1976) "Towards a New Partnership," *Science* 193:1199.
- Penner, S.S., and L. Icerman (1974) *Energy. Vol. 1: Demands, Resources, Impact, Technology, and Policy*, Addison-Wesley, Reading, Massachusetts.
- Pimentel, D., L.E. Hurd, A.C. Bellotti, M.J. Forster, I.N. Oka, O.D. Sholes, and R.J. Whitman (1973) "Food Production and the Energy Crisis," *Science* 182:443-449.
- Pollard, W.G. (1976) "The Long-Range Prospects for Solar Energy," *American Scientist* 64:424-437.
- Rose, D.J., P.W. Walsh, and L.L. Leskovjan (1976) "Nuclear Power—Compared to What?" *American Scientist* 64:291-299.
- Skinner, B.J. (1976) "A Second Iron Age Ahead?" *American Scientist* 64:258-269.



The Story Behind Accession #69-82-57

by H.A. Hargreaves

The archives of most universities contain an astonishing variety of materials, materials whose value may not be apparent when they are first accepted (gratefully or reluctantly), duly catalogued, and absorbed into the collection. But how does one determine whether materials have archival value? One asks first what kind of value they may have, and for whom. Then it may be possible to make some statement about how much value they have. One such set of materials is found in our own Archives, in a folder labelled simply "Accession # 69-82-57." The contents are unassuming: a letter, an offprint of a Memoir, and a clothbound book much like those still used to record customer transactions in small British shops. In the flyleaf, however, are the date 1912 and a signature, "W.W. Greg," in a hand matching the writing through the rest of this notebook. Here are two kinds of "value," for Greg (1875-1959) was a British medieval scholar, textual critic, and editor of international stature, whose signature and manuscripts have considerable historical worth.

If there were only these by which to weigh its value, of course, the notebook would be of relatively slight significance to the University of Alberta, but much more useful and valuable if placed with a collection of Greg's writings elsewhere. Indeed, one might well ask how the manuscript arrived here in the first place, since Greg never had a direct connection with this institution. Here the letter becomes important, for it reveals the connection and coincidentally adds more value, though of a different sort. Addressed to Mrs. F.M. Salter, it expresses the regret of Professor F.P. Wilson for the death of Professor Salter (22 August 1962), once Head of the Department of English here and an internationally known medieval drama scholar himself. Professor Wilson wrote: "I am sending you the Memoir I wrote on Sir Walter Greg for the British Academy. . . . and Sir Walter's Ms. of the Chester plays. . . . By all means give the library the Ms. as a memento of the association of two fine scholars." Here, then, is added significance for the manuscript, for it serves as a tribute to one of our own distinguished scholars and links him with the esteemed W.W. Greg.

What about the manuscript itself? One thinks immediately of various unpublished works by great literary figures that have been

discovered by diligent researchers, and this is, after all, handwritten by Greg. A title on the spine announces simply "Christ and the Doctors." Examination reveals that this is the generic title for no less than four plays on the subject, each from a major medieval drama cycle. Greg has laid them out in parallel across each double page of the notebook: York XX, Wakefield XVIII, Coventry's "Pageant of the Weavers," and Chester XI. In red ink he inserts page numbers and cross references for each play and underlines parallel passages; in both pencil and fine pen, collations from the other extant texts are interlined with the Chester play text. Last, a block diagram is folded in, showing the parallel passages rearranged and set alongside one another. It is an exciting find, but not because it is unpublished. On the contrary, little information that Greg did not publish himself could be gleaned from this manuscript. What is exciting is the insight it provides into the way a great scholar went about his analyses of extremely difficult textual problems.

At this point the Memoir comes into play too, for it provides clues to a fascinating reconstruction of Greg's use of the manuscript. Use it he did, but with each successive solution he raised more problems, and in all he worked over it (amidst much other scholarship) for a period of between twenty-five and thirty years. By following that history, we produce a striking picture of perseverance, ingenuity, and integrity: not only refusal to let a problem go unsolved, but refusal to provide a hypothetical answer until it had been given a sturdy foundation. Here is value of several kinds, intangible but unquestionable, for how does one measure the lessons of scholarly technique and the chastening example of patience and integrity that lie waiting? There is a bonus, too, for the individual from this institution who pursues this history to its very end, so a brief résumé would surely be worthwhile.

Professor Wilson had persuaded Greg in 1948 to work up some biographical notes, many of which he included in his Memoir of 1959. In one of these Greg reveals that his intense study of the Chester cycle plays probably began as early as 1906, with a scheme suggested to him by Walter Raleigh for the Clarendon Press. This was to be "three fat volumes" of select early English plays. "The scheme never came to anything," said Greg ingenuously, but he

listed a number of projects rising from it which he carried out, two of them editions of "Antichrist" and "Christ and the Doctors" from the Chester play cycle. He states disarmingly:

The *Antichrist* involved problems of textual criticism the principles of which were far from clear to me, however they might appear to others, and what was designed as a section of the introduction eventually grew into a small book, printed in 1927 as *The Calculus of Variants*. Another *parergon* was the series of lectures on "Bibliographical and Textual Problems of the English Miracle Cycles," that I delivered as Sanders Reader in Bibliography at Cambridge in 1913 and that appeared in *The Library* the following year.

Actually the work began, of necessity, with his study of the relationship of the four great drama cycles, rising straight from his comparative analysis of the versions of "Christ and the Doctors." This made up the bulk of the Sanders Lectures of 1913, all of which were published in 1914. His findings were quite a revelation, and caused a substantial revision of the accepted theories of cycle relationship held before his publications appeared. In order to work out his own theory, however, Greg had to hypothesize intermediate manuscripts, none of which are actually extant—a job something like describing a great-grandfather missing from the family tree. In this case he was able to reconstruct with considerable accuracy what the missing manuscripts must have been like.

When he began to work on the internal relationships of extant Chester cycle play manuscripts, Greg found that the solution to his earlier problem had supplied a method, but the actual apparatus for this much more complicated problem was still far from satisfactory. Therefore, as he noted, Greg spent several years working out a "calculus," which he published as an analytical tool in 1927. Only after this did he feel he was prepared to work out the annotated and "geneologically-based" editions of "Antichrist" and "Christ and the Doctors."

The *Antichrist* finally appeared early in 1935, but in the meantime a startling event had occurred. In his own extensive research on the Chester plays, Professor Salter had made one of those rare discoveries noted earlier—a hitherto unknown manuscript of "The Trial and Flagellation," yet another single play of the Chester cycle. Working with this new material, and fully aware of Greg's work,

including the *Calculus*, Salter was led to a different set of conclusions about the relationships of the extant Chester cycle manuscripts. Instead of looking elsewhere for publication, Salter first submitted his work to Greg himself, who was General Editor of the *Malone Society Studies*.

Greg was a scrupulously honest scholar. He recognised the great value of Salter's discovery and the plausibility of his conclusions, although he remained convinced of the equal plausibility of his own conclusions. For him, the solution was obvious. In a volume titled *The Trial and Flagellation with Other Studies in the Chester Cycle*, published late in 1935, he gave first place to Salter's work, second to his own rebuttal, and third to the long-germinating edition of "Christ and the Doctors," based again upon his use of the "calculus," and supported by comparison with the York cycle play. The result was a singular, if not unique, production by two great scholarly intellects, side by side, accurately presented, for their colleagues to assess. In ideal fashion they had agreed to disagree.

So the last, bonus, value of this manuscript is brought forward. Behind it is a story which makes the material under Accession # 69-82-57, perhaps more than Professor Wilson himself recognised when he wrote the words, "a memento of the association of two fine scholars."

How valuable is an archives acquisition? One usually cannot make a precise assessment, but one can establish the ways by which it is valued. In this case, the Greg manuscript has value because it is an "autograph" document, and more because it is written entirely in the internationally known scholar's own hand. The letter that accompanies it gives it more value for the University of Alberta because it becomes evidence of Greg's association with the institution's own outstanding scholar, Professor F.M. Salter. The manuscript has considerable scholarly value because it reveals the methods and professional stance of a fine intellect, and last, it has value as a prime example of integrity and mutual respect on the part of these two strong, dedicated scholars. No matter how one weighs it, that is a large measure of value.

Dr. Hargreaves is a Professor of English at this University.



F. M. Salter was one of the great teachers in the history of this University, but he was also a distinguished international authority on medieval and Elizabethan literature. He first came to the University of Alberta as a Lecturer in 1922; another early and notable Professor of English here, R. K. Gordon, wrote of him, "... his life had not been soft or sheltered. Among other things, he had been a salesman, a coal miner, and an undergraduate, and had served on the front-line trenches." After two years here he went to Chicago to continue his studies. There he became associated with J. M. Manly in editing Chaucer's *Canterbury Tales*. He received numerous honors in Canada and the

United States for his scholarship, and was the first recipient of the Huntington Library International Research Fellowship. He went on to teach at various American colleges and universities and returned to the University of Alberta only in 1939. Here he was for a time Head of the Department of English and taught until his death in 1962. He was also Editor of the early *New Trail* and a founding member of the Friends of the University.

Health for and by the People

by Gordon and Margaret Nikiforuk

The following article is an edited version of the first annual James McCutcheon Address delivered by Dr. Nikiforuk to the Faculty of Dentistry on 26 November 1977. Dr. McCutcheon, in whose honor the address was given, was Dean of the Faculty of Dentistry from July 1970 until his sudden death in December 1976.

On Health and Health Education

I have chosen to speak on health and health education—a subject that, I hope, is a common denominator for everyone, whether physician, dentist, nurse, pharmacist, student, or an interested person. The title of my presentation is a synthesis of titles of two recent books: *Health by the People* (Newell, 1975) and *Health is for People* (Wilson, 1976). I take my initial cue from Michael Wilson, who starts off his delightful book with the following paragraph:

In his novel 1984 George Orwell describes four ministries through which “The Party” holds power: A Ministry of Peace, concerned with war. A Ministry of Love, for law and order. A Ministry of Plenty to deal with scarcities. A Ministry of Truth, where a vast system of brain washing is planned and executed. He did not need to describe a Ministry of Health which deals with disease; we already have one.

There is a curious irony in our lives: in the face of an unprecedented knowledge explosion we seem to be paralyzed in our attempts to solve simple day-to-day problems of living; we are conquering ever more diseases and training more and better physicians, dentists, nurses, and pharmacists—and yet, the question for health remains as elusive as for the Scarlet Pimpernel. We are “doing better but feeling worse.” Even our praiseworthy Canadian health care system, as exemplified by the plan in Alberta or by the Ontario Health Insurance Plan, is concerned primarily with the treatment of illness, the search for cures for disease, and the prevention of communicable disease. There are overriding concerns also of health care delivery systems in other countries, for example, of the National Health Service in Great Britain. Could it be that the current health education and health care delivery model is deficient?

I believe it is. My premise in this discussion is that the false expectation of better health from bigger hospitals, from better

drugs, from more physicians, more dentists, more nurses, and more health care workers, does not encourage a concern for healthful environments, healthful life-styles, and the recognition of the importance of self-care and the care of one’s neighbor. What is the evidence that cracks exist in the ivory walls of academic, professional health education and in the health care delivery system?

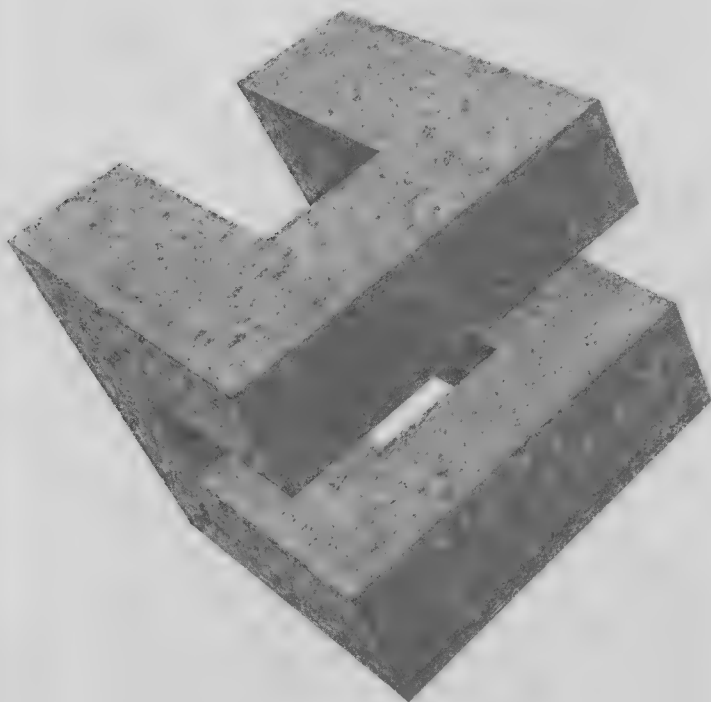
Before presenting my views, I wish to emphasize that the past achievements and indeed the present system have some admirable features. I wish to build upon the present. Let there be no mistake that the benefits from the current model are great; that many health professions by virtue of their humanitarian approach and professional skills have contributed immeasurably to the common good. The medical discoveries that resulted in germ-free water, that reduced infant mortality, controlled infectious diseases, led to improvements in hygiene and nutrition, and improved biochemical knowledge of metabolic disease and endocrine function, are major achievements. Though medical research has been significant in improving health levels, according to an analysis by McEwan (1971), the major contribution to improvement in health in global terms stems primarily from the limitation of family size, an increase in food supplies, a healthier physical environment, and, lastly, from specific preventive and therapeutic measures. Thus, modifications of behaviour and changes in environment have been dominant in improving health; and there are many reasons to believe that we must look to these factors for further advances. I do not wish to give demerit marks to current research activities. However, laboratory findings that lead to cures of illnesses are not enough. We must extend our search for health beyond the important efforts to control disease.

Deficiencies of Current Health Care Models

I have stated that the current health education and health care delivery models have major deficiencies. In order to support this I will cite some statistics, not only from the Canadian scene, but also from the National Health Service in Great Britain, and from some USA sources. While, strictly speaking, these regions may appear too different to permit miscibility of data, there are sufficient similarities

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in patterns of diseases, and in the changing nature of afflictions in all industrial nations, to suggest that data from other regions are relevant. First, it is essential to recognize how dramatically the pattern of human mortality has changed (Table 1 and Figure 1). It will be noted that the major causes of death are now related to chronic illnesses and accidents, with infections playing a relatively minor role. This is a turnabout from the situation in the 1900s when the major causes of death were primarily related to infectious diseases such as pneumonia, influenza, tuberculosis, diphtheria, and gastro-enteritis. Hospital morbidity, as measured by the number of hospital days, indicates that cardio-vascular diseases, injuries due to accidents, respiratory diseases, iatrogenic illness, and mental illness account for forty-five percent of time spent in hospital treatment (La Londe, 1974). However, the health care system is more geared to treating episodic illnesses than chronic disabilities. There is a surplus of expensive acute-care beds in hospitals in Canada, but not enough

of other needed health care facilities, such as home care centres, rehabilitation facilities, and community health centres. Also, while excess hospital facilities exist in some regions, other areas do not have access to needed medical and dental services.

The cost of health care in Canada has escalated at a rate of between twelve and sixteen percent, a figure considerably in excess of our economic growth. We spent a total of \$689 million on personal health care in 1953 and by 1971 this figure rose to \$5,109 million. Thus, the per capita expenditure during this period rose from \$46.4 in 1953 to \$236.6 in 1971—an expenditure which in 1953 was 3.53 percent of personal income and which rose to 6.96 percent in 1971 (Evans, 1975).

A look at the National Health Service of Great Britain, the oldest such service in the western world, is informative. Shortly after the inception of the NHS some thirty years ago, the scheme was heralded by Left and Right as “the envy of the world.” Now, few would deny the assertion that the NHS is creaking at its joints.

The architects of NHS were prodded by the assumption that the provision of effective health care to all when needed, free of charge, would soon result in a significant improvement in the health of people, so that demand for services and hence the cost would be reduced. Alas, the opposite has happened. In 1950, the cost of the health service was £500 million a year; now the bill is well over £6,000 million a year. But this large increase in expenditure may have been justified, had the health picture improved. The expectation of better health, however, by the introduction of a health scheme to treat illness in all people has proved to be an illusion.

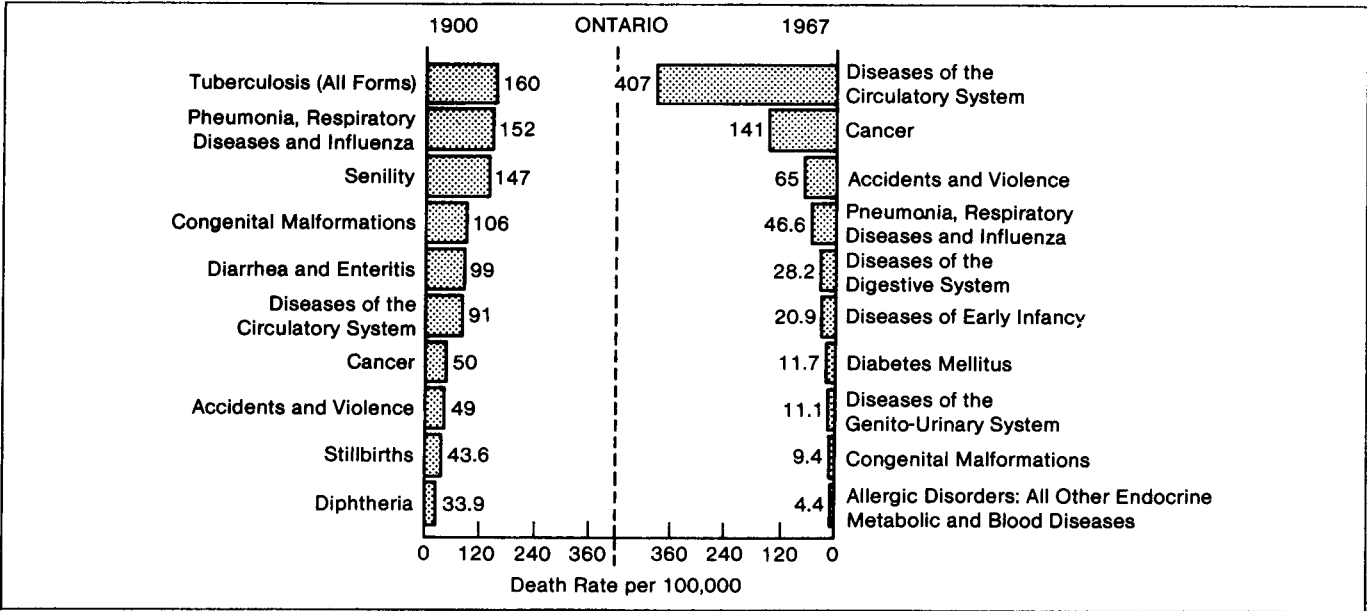
In Great Britain, over the past twenty years, time lost from work due to illness has increased twenty-four percent; and there has been a great increase in the amount of incapacitation due to “strains, stress, diarrhoea, nervous debility, headache, backache, migraine, and psychoneuroses” (Gould, 1977). True, the pattern of disease has been altered so that illnesses such as diphtheria, tuberculosis, pneumonia, and poliomyelitis are under control, and antibiotic agents, better nutrition and housing have reduced other afflictions.

Table 1. Major Causes of Mortality in Canada, 1971

	% of all deaths	Predominant Ages
Ischaemic heart disease	31.1	40 and over
Cerebrovascular disease	10.2	Age 65 and over
Respiratory diseases and lung cancer	10.0	Under 1 yr and 55 and over
Motor vehicle and all other accidents	7.6	All ages
Cancer of the gastro-intestinal tract	5.1	50 and over
Cancer of the breast, uterus and ovary	3.1	40 and over
Diseases specific to the newborn	2.1	Under 1 week
Suicide	1.6	15 to 65
Congenital anomalies	1.3	Under 1 year
Others	27.9	
All deaths 157,272	100.0	

(From LaLonde, 1974)

Figure 1. Changes in pattern of human mortality in Ontario, 1900-1967 (from LeRiche and Milner, 1971).



It is interesting to note that individuals such as professional persons, judges, bookies, and politicians, who are able to “do their own thing” use considerably less sick leave than the unskilled labourer. Thus, the highest rate of illness occurs when people earn a living by hard hand labour, or whose work is repetitive and uninspiring, and who have no input into their work environment. Nor has a comprehensive health care system had much impact upon heart disease, stroke, cancer and bronchitis, mental or dental health, on drug abuse, or iatrogenic illnesses. The death rate from chronic illnesses has increased and this is not simply a matter of more people surviving in the older age group. There are, obviously, stresses and strains in everyday living for large sections of the population that are not significantly ameliorated by the health care system. Of particular interest and significance is the fact that the health care system has less of an impact on health status than other socio-economic and life-style factors, (Backett, 1976). Estimates indicate that the health care system (including doctors, drugs, and hospitals) affects about ten percent of the usual indices of monitoring health; for example, mortality and days lost due to sickness. However, ninety percent of the health index is determined by factors outside the current medical system, such as life-style (smoking, exercise, worry), social conditions (income, eating habits, physiological inheritance), and physical environment (air and water quality). An important study by Belloc (1973) demonstrated a striking inverse relationship between individual health practices (weight, drinking, hours of sleep, regularity of meals, physical activity, smoking) and mortality rates, especially for men. This relationship was independent of income level and physical health status.

It would appear, then, that the current health care delivery system has great deficiencies because the emphasis is placed on treating and not on preventing disease. These deficiencies also appear to be the result of the exclusion of the role of social, economic, and environmental factors that have a direct bearing upon health. There are at least two other factors relating to health care delivery that require attention: the role of the hospital and the fragmentation of services as a result of over-specialization. These last two factors relate both to the delivery of health care and to the provision of professional health education.

The Hospital—Need for Community Health Centres

The home base for training health professionals in medicine and nursing and for the delivery of health care is the hospital. Similarly, the dental clinic in Faculties of Dentistry is the major clinical base for the training of students in dentistry. These important and rightfully revered institutions account for about forty percent of the nation's annual expenditure on health care (Greenberg, 1977). Of late, however, hospitals are more symbolized by a dialysis machine, emblematic of a technical solution to a health problem than by a portrait of Florence Nightingale, representing a caring, humane environment. The hospital is an effective environment for the treatment of diseases, but less so for the treatment of patients.

In a hospital, the patient is isolated physically and emotionally from the family and is transported through several diagnostic stations at which isolated lesions or suspected tissues or organs are subjected to a battery of therapeutic and surgical procedures. The professional is all-knowing and powerful; the patient is all-passive and submissive. Even the nurse's role is changing—I may add, unfortunately—from a caring, communicative health professional to one who, knowledgeable and skilful in the technical procedures, merely assists the physician. I do believe this is what nurses

want—this is what the system needs. The interpersonal relationship becomes very impersonal, and the patient is less a human being and more the man or woman with “Paget's disease” or “cystic fibrosis.”

It has been estimated that about ninety percent of the education and training for health professionals is in teaching hospitals, away from the patients's community and family base (*New Directions in Education for Changing Health Care Systems*, 1975). It is small wonder that the preparation of health professionals and the resources allocated to treatment of different illnesses do not relate effectively to the health problems in communities and families.

Fragmentation and Specialization in Education and Health Care

Now let me turn to the question of fragmentation in health care and education. This is indeed the age of the expert—the faithful pursuit of a narrow field without universalizing. Consider the number of specialties and the departmental structure in schools of dentistry or medicine. Consider further that in some institutions the resources have been allocated to departments. Thus, isolated disciplines and isolated specialists each vie for their “place in the sun,” and inevitably perspectives are lost. Buckminster Fuller (1977) described it this way:

Reality is invisible in our society because specialized people can't get a total view of what is going on in the world. That's why so many of our solutions are piecemeal.

I find that the question of fragmentation of knowledge has serious and important connotations in education.

A view of man has been developed, in the individual and social dimensions, as a hierarchy of interconnected natural systems (Figure 2). This approach illustrates the relations among biological and social sciences and also the fragmentation of the natural systems. It is interesting to note that, in the education of health professions, the emphasis is primarily on the hierarchy of molecules, organelles, cells, tissues, organs, and systems, and little emphasis is placed today upon the “person,” the family, community, and environment. Why is this so? Using this same systems model, and applying it to a disease example, one may easily observe relationships (Figure 3). I have used the systems model not only to emphasize the problem of fragmentation, but also to suggest its value in developing new concepts of health care. Mortimer Adler (1977) has advanced a series of negative conditions as prerequisites to any reform in education in a college or university, some of which conditions are germane to this discussion on fragmentation in education: “there should be no division of the faculty into professional competence in one department of learning rather than another.” “No member of the faculty should be unprepared to treat the course of study as a whole.” “There should be no written examinations.” “There should be no electives, no majors or minors no specialization in subject matter.” I wonder how many of you would accept this list from one of the most respected philosophers-at-large of our age?

Fragmentation creates dilemmas not only in education but also in health care delivery. To treat illness effectively requires an increasing array of specialists representing many disciplines and services which the patient must attempt to select for his own needs, or for the needs of his family. There are about 300 different health occupations in the USA; there are forty-one medical specialties that are recognized in many western countries. Let me illustrate the difficulties posed by fragmentation of services. Recently, a public health nurse received a call from a desperate mother who listed the following family problems: an unemployed husband and a young

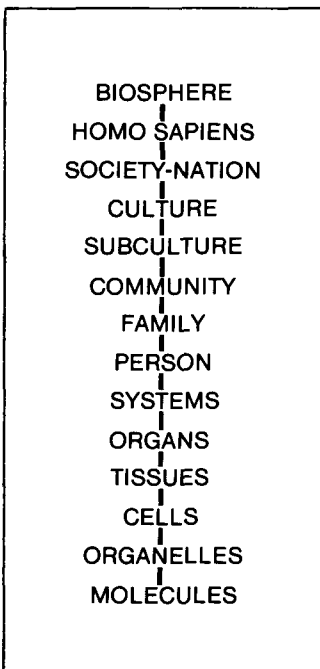


Figure 2. Hierarchy of natural systems constituting "Man" (from Brody, 1973).

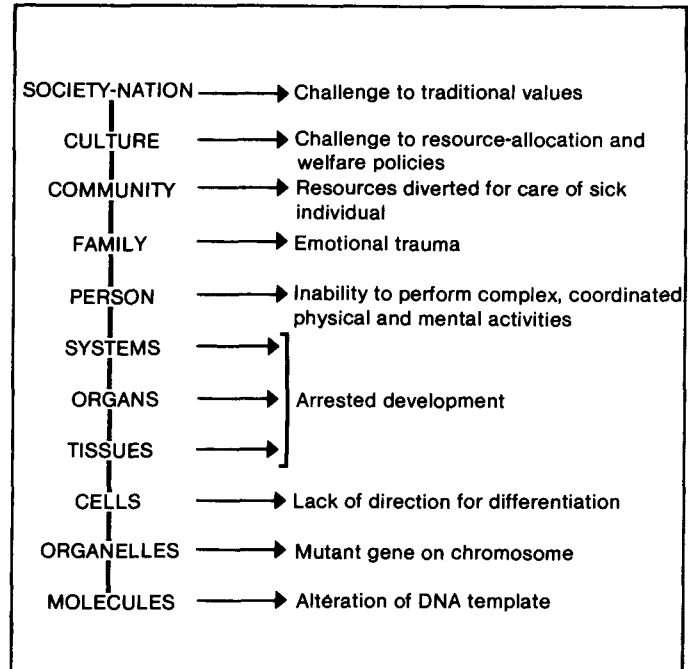


Figure 3. Disease example of disruption of hierarchy (from Brody, 1973).

son who suffered from a reading disability coupled with bed-wetting and nail biting. After hearing the family's problems, the public health nurse had to decide whether to send the family to a child guidance institution, to the mental health division, to the housing department, to the local pastor, or to have all these services arrive at the same time at the family's home, along with a traffic policeman. One cannot help but have misgivings about such an unmanageable array of services, and wonder whether their concern was with the total health problem of the boy and the family, or "simply with the fragments—the bits and the pieces—within the family's life."

Now I should like to turn to two areas that relate specifically to the education and training of professional health personnel, viz., the need to increase emphasis on primary prevention and behavioral science teaching, and the need to broaden and diversify the base of student admissions to professional faculties.

Need for Primary Prevention and Behavioral Sciences

The education of health professionals today is primarily science-oriented—the total curriculum in most schools is based upon the physical and biological sciences with, until recently, only a sprinkling of social-behavioral sciences. In the recent symposium "The Behavioral Sciences and Preventive Medicine" (1974), many speakers were clear in their recommendations that the relationship between health and behavioral science faculties need to be established and strengthened. Some recommendations by individual authors and by the conference are as follows:

1. "All medical and health science students should be required to complete successfully introductory courses in sociology, anthropology, economics, political science, and psychology as a requirement for admission to a health science department."
2. "All undergraduate students should be taught the behavioral

determinants of disease, models should include those diseases in which the determinants are most powerful (i.e. social diseases such as alcoholism and suicide)."

3. "Expand training opportunities at post-doctoral and pre-doctoral levels to permit support for training in the behavioral sciences."
4. "Undergraduate students should be taught an introductory course on the health care systems as a social system."
5. "The Federal Government should increase its support for research on the behavioral determinants of disease and the application of behavioral technology to prevention."
6. "Both the academic community and the Government should initiate programmes to apprise the public of the currently available behavioral science knowledge, including the sociological, economic and demographic factors that relate to health and disease."

These recommendations present some important challenges to the university. In essence, the challenge is that preparation of professionals who are competent and technically expert is not enough; the professional must become educated to understand the human purposes of his task and seek to prevent as well as treat illness. Pellegrino, (Boley, ed. 1975) wrote on this subject:

The University cannot meet all its responsibilities without refurbishing the traditional functions of the humanities as agencies for teaching the liberal arts, not only to the undergraduates, but also *pari passu* with professional and continuing education. This is a difficult assignment, but only in its ardent pursuit can the University remain authentic and regain the respect and support it seems to be losing in contemporary society.

It all sounds so good, but it is not as good as it sounds. Can even superb courses in the behavioral sciences solve the problem of giving us a more human dimension? A lecture or seminar, *per se*, does not impart ethics and values. There has to be a deeper

commitment on the part of everyone to uphold certain value systems in our educational, economic, and social fabrics.

Health of man and woman then could no longer be negotiable by an industry that says it cannot afford to clean up environmental pollutants; or by governments that speak with forked tongues about “life-style” and behavior modification, but which do not look at underlying causes of aberrant life-styles. The disharmony in planning among economic, educational, health, and social systems has to be eliminated.

I feel that the introduction of behavioral science courses is desirable but, again, it is not enough. We may do better by introducing changes in education that will bring the student into a more direct contact with the family and the community. The shifting of clinical preparation to community health centres and away from the hospital base, for example, will surely acquaint the student with the pattern of illness in a community, and will bring him face-to-face with the social and environmental factors that affect the well-being of people. Or let us consider the problem of alcoholism in the far north. It is one thing to be treating an alcoholic in an aseptic hospital, but another to face the situation in Dawson City, Yukon, where loneliness, the transitory economic security, and the lack of family support stare you in the face.

I am pleading for an emphasis on primary prevention through an understanding of the basic physical and emotional needs of man that are prerequisites of good health. Health is associated with factors that relate to humaneness, to interpersonal relations, and, above all, to a recognition that a person's needs are not only physical, for example, food and water, but also emotional, for example, the need for a personal and social identity, the need for self-actualization, for communication, for love and caring, and for participation by the individual in his or her own destiny. The Berger report (1977) and its reference to social factors and health in Canada's North powerfully documents this fact.

Who shall be admitted to the Health Professions?

The selection of students who will enter our nursing, dentistry, pharmacy, and medical schools needs a new look. The idealist version of a college education that depicts a University of Toronto or Harvard on the one hand and a dedicated, secure and serene student on the other owes more to romanticism than reality. The competition for entry to these schools is keen, and the statistics indicate that the rejection rate is well over two thirds of the applicants.

I wonder whether we have not reached the point of diminishing returns in our efforts to select the best as judged by a student's ability to write examinations. I would like to see the current pool of applicants enlarged to include students with a broader educational base. It can be argued that a course in philosophy and psychology is as valuable a prerequisite as a course in physics. A knowledge of a student's life-time effort, what he has been doing, where, and who knows him, his work, and life-style, are probably as significant to his future utility as his marks and the courses he has taken. Experimentation in this area is needed, with a view to ensuring the admission of a more diverse student body, which, it is to be hoped, would possess a great feeling for humans and service. Interviews of candidates should be considered in spite of potential bias. In this regard, our experience in the Faculty of Dentistry at the University of Toronto based upon the McMaster University model is favorable. We may not have picked many Florence Nightingales, Oslers, or G.V. Blacks, but we have done at least as well as a selection process

based solely on an academic yardstick. (It is interesting to learn that in Holland the lottery system is an important part of selection of students to professional schools.)

Recently, a new test has been devised to assist in the selection of medical students. The new six-hour test is devoted to multiple choice examinations in biology, chemistry and physics, and in skills analysis. I consider this a re-shuffling of the old test. If you can memorize facts, you are away to the races. The behavioral attitudes, the motivation, the personal stability, the feelings, the interpersonal relations are too elusive to be given much consideration. Even interviews are shied away from as being too time-consuming and too subject to bias.

Summary

I shall attempt to recapitulate my remarks by suggesting a few recommendations that encompass the views that I have attempted to expound. At the risk of over-simplification, I am suggesting that the following attributes of health care and health education require a higher priority:

1. Development of clear and explicit national health policies, including monitoring of health, both of people and communities, using indices that relate not only to diseases, but also to qualitative aspects of life.
2. The assignment of a much greater priority to the training of a community health worker and health educator—such as the public health nurse—whose base will be the school, the family, and the community.
3. Development of massive educational, positive health promotion programs in families, schools, and communities.
4. Training of more primary care health professionals, like general practitioners, and fewer specialists.
5. Development of a community and primary care role for teaching hospitals.
6. Development of curricula directly related to primary care.
7. Development of programs that strengthen family units and promote community ties.
8. Changing the criteria for admission to health professions and for the selection of students whose interests and attributes fit them for general practice and service.
9. Development of educational programs for health professionals in community settings, where interprofessional interaction is encouraged.

Stubborn problems of health, the origins of which stem from improper social strategies and planning, will not yield to traditional approaches. A mechanistic approach may cure a disease but it will not assure health in an individual or a community. In the final analysis, health cannot be separated from educational, economic, or social policies.

I suspect that there will be no highly satisfactory or simple solution to the problems discussed here. We will have to work back to answers for T.S. Eliot's more searching questions: “Where is the wisdom we have lost in information? Where is the understanding we have lost in knowledge? Where is the life we have lost in living?” And I may add in a less graceful note: “Where is the better health we seek by curing diseases?”

I do not wish to end on a negative note. The health care and the health education segments of our society have been reasonably successful, and have contributed significantly to our lives. Now we

recognize deficiencies in the system; some consider these deficiencies to be of crisis proportions. The Chinese have a symbol for crises—it consists of a character for danger and a second one for opportunity. This is my view. Most of our problems in health and education are iatrogenic—caused by the medical professions themselves—and hence are reversible and subject to correction.

Far from being pessimistic, I am a congenital optimist. In what other period of history have changes occurred as rapidly, bringing about the potential for major shifts in direction? When has mankind so clearly recognized the finite nature of resources as at present? When has such an advanced technology been available to serve mankind? Can you conceive of the possibility of a document similar to the Berger report a few decades ago? In the past have you heard educators speak of the shortcomings, the parochialism and the rigidity of their special pursuits as they do now? Who dared question the sacrosanct yardstick—the examination—few years ago? I believe that experimenting with new ideas and self-criticism is healthy and an indication of a caring attitude towards our institutions. We do not have to abandon current institutions; we have to work from within to remedy the ills that afflict them. We can thus ensure a more exciting educational environment for more committed and mature students, and thus aim at a better health for the people through recognition of the basic physical and emotional needs of man and woman.

Gordon Nikiforuk is a Professor of Preventive Dentistry and is a former Dean of the Faculty of Dentistry at the University of Toronto. Margaret Nikiforuk is a Public Health Nurse at the North York Health Unit.

References

- Adler, Mortimer J., *Philosopher at Large: An Intellectual Autobiography*. New York: MacMillan, 1977.
- Backett, E.M., "A comment on the strategic planning of health education," *International Journal of Health Education* 19 (1976):149.
- Belloc, Nedra B., "Relationship of health practices and mortality," *Preventive Medicine* 2 (1973):67.
- Berger, T.R., *Northern Frontier, Northern Homeland*. The report of the MacKenzie Valley Pipeline Inquiry, Vol. 1. Ottawa: Minister of Supply and Services, 1977.
- Boley, Bruno A., ed., *Cross-fire in Professional Education: Students, the Professions and Society*. New York: Pergamon Press Inc., 1975.
- Brody, Howard, "The system's view of Man: Implications for medicine, science and ethics," *Perspectives in Biology and Medicine* 17 (1973):71-92.
- Evans, R.G., "Beyond the medical marketplace: expenditures, utilization, and pricing of insured health in Canada," in *National Health Insurance—Can we learn from Canada?* edited by Spyros Andropoulos. New York: J. Wiley and Sons, 1975.
- Fuller, Buckminster, "New Directions in the Humanities," Conference in San Antonio, January 1977.
- Gould, Donald, "Delivering health care wisely and well," *New Scientist* 73 (1977):15.
- Greenberg, D., "Holding health costs," *New Scientist* 73 (1975):41.
- Kane, R.L., *The Behavioural Sciences and Preventive Medicine*. United States Department of Health Education and Welfare Publication 76-878, 1974.
- LaLonde, Marc, *A New Perspective on the Health of Canadians*. Ottawa, 1974, p. 22.
- LeRiche, W.H., and Jean Milner, *Epidemiology as Medical Ecology*. London: Churchill and Livingston, 1971.
- Maslow, Abraham H., *Toward a Psychology of Being*. Second edition. New York: D. Van Nostravel, 1968.
- McEwan, T., *Medical History and Medical Care: A Symposium of Perspectives*. London: Oxford University Press, 1971.
- Newell, K.W., ed., *Health by the People*. Geneva: World Health Organization, 1975.
- Organization for Economic Co-operation and Development, *New Directions in Education for Changing Health Care Systems*. Paris, France, 1975, p. 93.
- Wilson, Michael, *Health is for People*. London: Denton, Longman and Todd Ltd., 1976.

campus reporter

Students' Union and Community Day Care Centre

Another Project Assisted by the Alma Mater Fund

Thanks to the generosity of the Alma Mater Fund, the Students' Union and Community Day Care Centre, located in HUB, will be getting a face lift. The Centre has been the grateful recipient of a grant of \$9,000 to go toward capital improvements of the facility. These will include remodelling of one room, placement of new floors in two-storey areas to increase storage space, remodelling of the cloakroom, painting the entire centre, and new carpets.

The Centre has been in operation since September of 1972. It was established under the guidance of a Students' Union Day Care Commission, a group of very dedicated people, some of whom are now alumni, who worked very hard to lobby for space in the new HUB Building for a day care centre. Because the students were the ones who worked so diligently to establish a centre, and because the Students' Union at that time extended an interest-free loan to the Centre for internal modelling, the prime users of its service are the children of students.

Day care is provided for sixty pre-school children from the ages of 2 ½ to 6 years on a full-day basis. Priority is given to single-parent students whose children make up fifty percent of the enrollment. Thirty percent of the children enrolled are from two-parent families where at least one of the parents is a student, ten percent of the total enrollment is from the non-academic staff, and ten percent is drawn from the outside community. The Centre provides two thirds of the children's nutritional requirements since they attend the Centre for eight hours.

The Centre has a staff complement of eight child-care workers who are trained professionals in the area of early childhood. They aim to create a learning environment in which children can develop all the different facets of their personalities. A strong emphasis is placed on social and emotional well-being. At the Centre, a special emphasis is also given to development of a child's cognitive skills.

The Centre is also fortunate to have an adjacent adventure playground that was designed and developed by the Campus Development Office. It can be used in winter and summer to provide a variety of outdoor activities for the children.

Being part of the University community is also a great advantage for the Day Care Centre



Last February the Golden Bears Hockey team went on tour to Japan, where they won the Pacific Rim Tournament and proved a great hit with Japanese kids. Photo: Steve Hoffert.

because it is able to use many of the facilities available on campus. The children participate in swimming and gymnastic programs. Music students also come to the Centre to provide educational entertainment. In addition, the children visit many University departments to see how they work.

The administration comprises a Board of Directors with members drawn from the faculty, non-academic staff, and the student body of the University, as well as from parents and members of the local community. The Centre is responsible for establishing policies within the guidelines set by the City of Edmonton. Being a government-subsidized facility, it receives support from the three levels of government on a cost-sharing basis. Parents' fees, varying at this time from \$20 to \$200 per month, are based on the gross income of the family.

There is, however, no provision for capital expenditures and so donations such as the one from the Alma Mater Fund are greatly appreciated. When the renovations are completed all alumni will be cordially invited to

drop by, spend some time with the group, and view the alterations that will make the Centre a more enjoyable environment for the children.

Agriculture-Forestry Centre

The Faculty of Agriculture and Forestry, whose undergraduate enrollment has increased from 372 students in 1967-68 to 932 in 1976-77 is delighted that final approval has been given for construction of a new Agriculture-Forestry Centre to the east of the General Services Building. The construction of the new building has already begun and is expected to be completed by 1981. The Faculty of Agriculture and Forestry is the premier agricultural institution in western Canada and has served for many years as the unofficial research arm of the provincial government with respect to agriculture.

International Gymnastics The inaugural Pacific Rim Gymnastics Competition was held at the University in May. This competition drew athletes not only from Canada and the United

States but also from as far afield as the People's Republic of China and Australia. It is hoped that the competition will become an annual affair and that it will attract the participation of gymnasts from other countries with a Pacific coastline, for example, Mexico and Japan.

Slowpoke Nuclear Reactor In April the University's Slowpoke Nuclear Reactor Facility was officially opened, though it had been in operation since fall 1977. The reactor facility has, as its primary user, the Faculty of Pharmacy and Pharmaceutical Sciences and is the only such facility in operation at a university in western Canada.

One of the major uses to which the reactor will be put is the examination and isolation of abnormalities in bony tissue by the use of radioactive fluorine. This element quickly locates in bone and research is being conducted in the Faculty of Pharmacy and Pharmaceutical Sciences to combine the element into compounds that will accurately delineate tumors. Other medical applications will include the preparation of radioactive gold for studies in arthritis and radioactive phosphorus for studies in tooth decay.

Honorary Degrees Awarded At Spring Convocation, held towards the end of May, seven distinguished residents of Alberta were awarded honorary Doctor of Laws degrees.

Georges Bugnet, a nonagenarian who resides in Legal, Alberta, became the first person ever to be awarded a University of Alberta degree in a special ceremony off campus. Dr. Bugnet is a noted author and horticulturalist who first came to Alberta in 1905 at the age of twenty-six.

George B. McClellan is well known for his contribution to the administration of justice as a Commissioner of the Royal Canadian Mounted Police and as Alberta's first Ombudsman. **Louis A. Desrochers**, a former Chancellor of this University and graduate of the Universities of Ottawa and Alberta, is a person who has striven for a better understanding between the French and English speaking communities in Alberta and nationally. As a member of the Board of Governors and as Chancellor, Dr. Desrochers has made substantial contributions to the intellectual and spiritual development of this University. **Gordon K. Wynn**, the Edmonton architect and Chairman of the University of Alberta Hospital Board, graduated from this University in 1936. As Chairman of that Board since 1964, Dr. Wynn has played a most significant part in the development of the hospital and in the enhancement of health care services within this province. **Anne Anderson** is a

person who has devoted herself to the preservation and communication of native culture within this province and of the Cree language in particular. Dr. Anderson's work in the Cree language has enabled hundreds of students of all ages gain a knowledge of, and share in, the rich linguistic and cultural heritage that is an integral part of our society. **Alexander Smith** retired from his appointment in the Faculty of Law in 1973 after thirty-one years of service at this University. As a teacher he gained the admiration of his students and colleagues. His book, *Commerce Power in Canada and in the United States*, has received wide acclaim as

one of the most interesting, scholarly, and useful works on constitutional law written in this country.

Senate Offices Opened In May the new offices for the University of Alberta Senate were officially opened in Athabasca Hall. The offices are the first permanent quarters to be allocated to the Senate since the time of its first meeting on 30 March 1908. The enhanced role of the Senate in recent years and the increased participation of the public in University affairs has made these quarters not only desirable but essential.



John L. Schlosser, past Vice-Chairman of the Board of Governors and past Chairman of the Board's Finance Committee, was appointed Chairman of the Board with a term of office effective from 1 July 1978. Mr. Schlosser, who attended both the Universities of North Dakota and Alberta, is a man who is well known for his efforts in promoting the cultural and community life in the City of Edmonton and the province of Alberta.

Just Say it



Long Distance
Phone a friend .. it feels good!

 AGT

the alumni

'25

A former director of the research department, Searle Grain Company, **Wilfred G. Malaher**, BSc(Ag), continues to enjoy retirement in Victoria.

'35

Marshall Kulka, BSc, retired in 1976 but he still spends much of his time at his bench at the Uniroyal research division in Guelph.

'37

Well-known and highly regarded for his achievements in education, **S.C.T. (Stan) Clarke**, BA, was recently presented with an honorary membership by the Alberta Teachers' Association.

'38

R.A. (Bob) McCullough, BCom, is with Ocelot Industries Limited.

'39

W.E. Grummitt, BSc, has retired as senior research officer, environmental research branch, Chalk River Nuclear Laboratories.

'41

Harry Leggett, BSc(Ag), has joined Canadian Seed Growers' Association. Since 1970 he has been the director of the federal department's Grains and Special Crops Division and production advisor to the government's Grains Group. **Harry E. Patching**, BSc(Ag), is the first vice-president of the Alberta Wheat Pool. He operates a 2,100 acre grain farm south of Lethbridge.

'47

Ed Panchysyn, BSc(Eng), is vice-president, operations, Manalta Coal Limited.

'48

After many years of service with Echo Bay Mines Limited, **J. Frank Burton**, BSc(Eng), has assumed the vice-presidency and general managership of the company.

'49

Widely known among livestock producers, **Al Church**, BSc(Ag), has been elevated to a major new liaison post by the Manitoba Government, this role being to work with government and beef cattle producer groups in the province. Mr. Church joined the Manitoba Department of Agriculture in 1958 as a beef cattle specialist and

was later promoted to livestock commissioner and director of the animal industry branch of the department. The new chairman of the National Energy Board, **Jack Stabback**, BSc(Eng) is a decided optimist about Canada's energy future. Mr. Stabback is the NEB's fourth chairman in its nineteen-year history.

'50

One of three senior staff appointments, **W.G. (Tim) Tyler**, BSc, is vice-president, production, Pembina Pipeline Limited. **L.R. Warden**, BSc(Ag), is manager of the J.I. Case Canadian Agricultural Equipment division, with offices in Regina. Involved in all phases of pipeline construction in Canada and the United States, including Alaska and overseas, **J.W. McCarthy**, BSc(Eng), is president of Pitts Price Pipelines Limited.

'51

An overseas appointment has **G.H. Bowman**, BSc(Eng), as director and manager with Ranger Oil (UK) Limited, head office, London, England.

'52

A special advisor on foreign affairs to the Prime Minister for ten years, **Ivan Head**, LLB, has been named president of the International Development Research Centre (IDRC). The IDRC is a federal agency that conducts and supports research into problems of developing regions. A well-known Peace River lawyer, **J. Wilbur Freeland**, LLB, has been appointed Queen's Counsel. **Bob Elliott**, BSc(Ag), MSc'59, is serving a three year term as a public representative on the board of governors of the Grande Prairie Regional College. Dr. Elliott is employed at the federal department of agriculture research station, Beaverlodge, and was mayor of the town from 1971-77.

'53

Darol Wigham, BSc, is vice-president, explorations, Pembina Pipeline Limited.

'54

With twenty-four years of experience in the petroleum industry, **Robert K. Craig**, BSc(Eng), is now chief executive officer of the Saskatchewan Oil and Gas Corporation (Sask. Oil) with headquarters in Regina.

'55

G.J. DeSorcy, BSc(Eng) continues as a vice-chairman of the Energy Resources Conservation Board. A member of the Alberta

Law Society committee on legislation and of the National Association of College and University attorneys, **J.B. Dea**, LLB, has been named a district court judge.

'56

Donald J. Robertson, BSc(Ag), is chairman of the board of governors, Olds College. **Gordon E. Arnell**, BA, LLB'57, is a trustee of TD Realty Investments.

'58

W.L. (Bill) Owne, BSc(Ag), has joined the Alberta Hog Producers Marketing Board as public affairs manager.

'60

The Department of Rural Economy within the University's Faculty of Agriculture and Forestry has a new chairman, **Mel Lerohl**, BSc.

'61

Wayne M. Newhouse, BSc(Eng), is co-ordinator, gas and oil sales, production department, Norcen Energy Resources Limited, Calgary. **Dennis E.G. Maschmeyer**, BSc(Eng), is project manager, metal and chemical division, Sherritt Gordon Mines Limited, Fort Saskatchewan. **Reginald E. Griffiths**, BSc, is exploration manager, Buttes Resources Canada Limited.

'62

B. Gerrit te Kampe, BEd, MEd'70, is principal of William E. Hay Composite High School, Stettler. **Dean McMullen**, BSc, MEd'66, received a Canadian Silver Jubilee Medal in appreciation of his work within the profession of teaching. The Energy Resources Conservation Board has **Fred Homeniuk**, BSc(Eng), as its manager, hydro and electric department.

'63

B.R. Cheesman, BSc, is senior district geologist, exploration department, Pacific Petroleum Limited. **Andrew Celmainis**, BA, is head of the new Western Canada office, Herman Smith Management Resources Inc.

'64

A principal of Vegreville High School since 1966, **Harry Chomik**, BEd, was recently elected to serve on the University Senate. A former Red Deer city alderman, **Morris Flewwelling**, BEd, is the new director of the Red Deer and District Museum. Mr. Flewwelling is a founding member of the Red Deer and District Museum Society,

and is also a founding board member of the Alberta Historical Resources Foundation. **N.W. Plotke**, *BSc(Eng)* is vice-president of MHG International Limited. **Mac Campbell**, *BA*, is vice-president, finance, Daon Development Corporation. Making tracks all over the world, **Jack Nodwell**, *BSc(Eng)*, is president of Canadian Foremost Limited, a world leader in the manufacture of all-terrain vehicles for transportation over swamp, muskeg, desert, arctic tundra, or tropical rain forest. Almost 90 percent of Canadian Foremost vehicles are exported to other countries.

'65

Sheila Ryan, *BSc(Nu)*, is the new director of nursing at UBC's Health Sciences Centre Psychiatric Hospital, Vancouver. **James A. Dabbs**, *BCom*, is executive vice-president, Siebens Oil and Gas Limited.

'66

Anne Frank, *BA*, *MA*'72, has had a rapid rise in the CBC television drama department since she joined it in 1974.

'67

Gary F. Aitken, *BCom*, is chief negotiator in the land department, Canadian Hunter Explorations Limited.

'68

Judy (Eifert) Lathrop, *BSc(Nu)*, is chairman of the nursing department, Mount Royal College, Calgary.

'69

Gareth R. Crandall, *BSc(Eng)*, is vice-president and general manager, Hycarb Engineering Limited. Hycarb specializes in the planning and management of worldwide projects in the formative stages for the energy and chemical industries. **W.A.R. Braybrook**, *BSc(Eng)*, is drilling and production manager, Great Basins Petroleum Limited. **Art N. Pedersen**, *BSc*, is working with stars, operating the Alberta culture department's mobile planetarium—a first for Canada. **Gerald L. Bolton**, *BSc*, is research chemist, research and development division, Sherritt Gordon Mines Limited, Fort Saskatchewan.

'70

It was Canadian statesman D'Arcy McGee who said "... We should look upon the emigrant ... as ... greater than kings. ..." **Zonia Keywan**, *BA*,

MA'73, resident of Montreal, has made this the theme of a book, *Greater Than Kings*, which deals with the coming of the Ukrainians to Canada. **Roger Stuber**, *BSc(Eng)*, is operations manager, Eagle Explorations Limited.

'71

Neil M. Campbell, *BA*, *BCom*'74, is director of labour relations for the New Brunswick nurses' collective bargaining council.

'72

Paul Brown, *MHSA*, is an assistant executive director with the Canadian Health Association. **Robert Wigelsworth**, *BSc(Eng)*, is assistant chief engineer, underground, McIntyre Mines. **Bill Malma**, *BPE*, is assistant to the director, Stratford Festival Company. Keyano College, Fort McMurray, is now a public college. **Roger Bernatzki**, *MA*, is chairman of its seven person board of governors.

'73

A lifetime ambition was realized recently by **Robert Donald McIntosh**, *LLB*, when he assumed the post of provincial court judge for central Alberta. **John Diakow**, *BSc(Eng)*, is smelter operations engineer, Inco Metals Company, Thompson, Manitoba.

'74

One of the largest new businesses in Lacombe is **Ron Ritten's**, *BSc(Pharm)*, Parkland Pharmacy. **Stephen Gardner**, *BSc*, has been with Luscar Limited since 1975.

'75

Susan Collins, *BA*, continues to exhibit her art in a number of galleries and shows throughout Canada, Hawaii, Australia, and Britain. **Lawrence F. Spreng**, *PhD*, is Assistant Professor of psychology, Duquesne University, Pittsburgh.

'76

An entrepreneur in her own right, **Sharon A. Sorenson**, *BEd*, owns her own insurance business in Edmonton, Ardon Assurance Service Limited.

'77

Roy Baguley, *BSc(Eng)*, is with Hanson Materials Engineering Limited, Edmonton. The first fulltime co-ordinator of the Prairie Gallery in Grande Prairie has set his sights high in attempting to improve opportunities for artistic development in the region. **Lane Borstad**, *BEd*, hopes to open up more opportunities for artists

to display their work, to give both artists and the public the stimulation of new ideas in the visual arts. The Canadian Foundation for the Advancement of Pharmacy has announced that **Stephen Mallet-Paret**, *BSc(Pharm)*, is the winner of its fellowship in professional practice.

'78

Phyllis Leith, *BA*, continues work with the Territorial Government at Inuvik in the Western Arctic. **William J. McPhee**, *PhD*, has been appointed to the plant pathology section, Summerland Research Station, near Penticton, B.C.

In Memoriam

Mary (Lackey) Robson, *BA*'19, in Victoria
O.E. Qualley, *DDS*'31, in Duncan
Philip J.G. Rock, *BSc(Ag)*'35, in Drumheller
G.F. Gemeroy, *DDS*'41, in Palm Springs
F. William Tysoe, *MD*'45, in Vancouver
Grace Burchell, *BEd*'52, in Edmonton
James McFall, *BSc(Eng)*'70, in Edmonton

On-Campus Privileges

Privilege Cards

Full on-campus swimming privileges for alumni and their families are extended at the University's Physical Education and Recreation Centre. Privilege cards for 1978-79 are now on sale at the Alumni Office, 430 Athabasca Hall, Edmonton T6G 2E8 (phone: 432-3224). Yearly rates (April 1978-79) are: Alumni family \$50.00; single alumnus \$30.00. Towels and lockers (for adults only) are available from the equipment room for \$10.00. Indoor and outdoor jogging, and weight lifting room (adults only) are free with privilege cards. Hours of operation of the Physical Education and Recreation Centre are 7 a.m. to 10 p.m. daily. Sundays 10 a.m. to 4:30 p.m.; Saturdays 8 a.m. to 10 p.m. Statutory holidays — closed.

Library

Alumni have certain library privileges. They may use library materials. Borrowing privileges are permitted to members of the Alumni Association who have a demonstrable research need. Arrangements for borrowing privileges should be discussed with the head librarian's secretary at 432-3790, fifth floor, Cameron Library.

The 39th Annual Meeting of the General Alumni Council

The 39th Annual Meeting of the General Alumni Council was held at Lister hall in early May. At the day-long session business was reviewed and amidst a collection of other decisions steps were taken to fulfill the **Maimie S. Simpson Memorial**. Miss Simpson was a former Dean of Women. To perpetuate her name on campus an academic scholarship(s) will be established, a number of art works purchased, and a plaque installed in Pembina Hall. The council was adjourned at noon for picture purposes. Seen with University President, Dr. Harry Gunning and Mrs. Gunning are:

Back Row (left to right) Chuck Moser, BPE'64, Physical Education; Ken Wallace, DDS'73, Dentistry; Morris Flewwelling, BEd'64, Red Deer; Jim Fleming, BSc(Ag)'51, Vancouver; Norm Cuthbertson, BEd'47, Victoria; Bill Presling, BEd'52, Community Relations; Cy McAndrews, BSc(Ag)'50, Past President; Dave Ellis, BSc'48, Toronto; Frank Kozar, BEd'56, Grande Prairie; Alex Cairns, BA'38, Honorary Secretary.

Front row (left to right) Alex Markle, BA'48, Director; Maureen Fleming, BEd'71, Red Deer; Judy O'Brien, Red Deer; Louise Arbeau, Dr. Harry Gunning, University President; Donna Gunning, BA'61; Bud Arbeau, BEd'53, President; Louise Estwick, BSc(HEC)'49, Ottawa; Bob Edgar, Pharm'55, Vice-President; Olly Kochan BSc(Pharm)'56, Pharmacy; Olga Saley BSc(Nu)'62, Nursing; Sally Abbott, BSc(Nu)'62, Montreal; Dave Usher BSc(Eng)'49, Engineering.

G.B. Taylor Award

The Dental Alumni Branch is an affiliate of the General Alumni Association. Largely as a result of the enthusiastic efforts of its President, K.L.M. Wallace, DDS'73, the G.B. Taylor Award was presented to the Dental unit at the annual meeting. The Award, named after a former long-time registrar of the University, is emblematic of the best graduate unit in province. Seen making the presentation to Dr. Wallace is Bob Edgar, Alumni Vice-President (left).





Special presentations at annual meeting

To conclude a busy day's activities, alumni representatives attending the alumni annual Council meeting in May were dinner guests at the home of Alumni President, Bud Arbeau and Mrs. Arbeau. There were a number of special presentations made.

Honorary Lifetime Memberships in the Association were placed with retiring Chancellor Ron Dalby, BSc(Eng)'52, (right), and also the Registrar of the University, Alex Cairns, Honorary Secretary of the Association.

A handsome plaque was presented to Garth Fryett, Q.C., LLB'52 (left) in recognition of special services on the Board of Governors, as Alumni representative.

The placing of the traditional engraved cufflinks with the outgoing Alumni President Bud Arbeau by Bob Edgar (right), the new President.

A "Capital" Winner.

The Burgess Alumni Trophy presented each Spring to the best all-round Alumni branch out-of-province was placed this Spring with the Ottawa unit. Seen accepting the trophy, and its miniature, from Alumni President Bud Arbeau, is Mrs. Louise Estwick, BSc(HEc)'49.



did you know?????

... that all who graduate from the University of Alberta are automatically members of the Alumni Association for life, at no fee

... that there are upwards of 60,000 graduates of the University with known addresses on computer tape

... that the business of the Alumni Association between annual meetings is conducted by an alumni executive committee composed of graduates from each of the eighteen faculties of the University

... that there are eight branches of the Alumni Association located in Alberta and in major cities across Canada

Canadian Federation of University Women

Club Directory (Presidents) for Alberta

Calgary

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(403-288-9061)

Edmonton

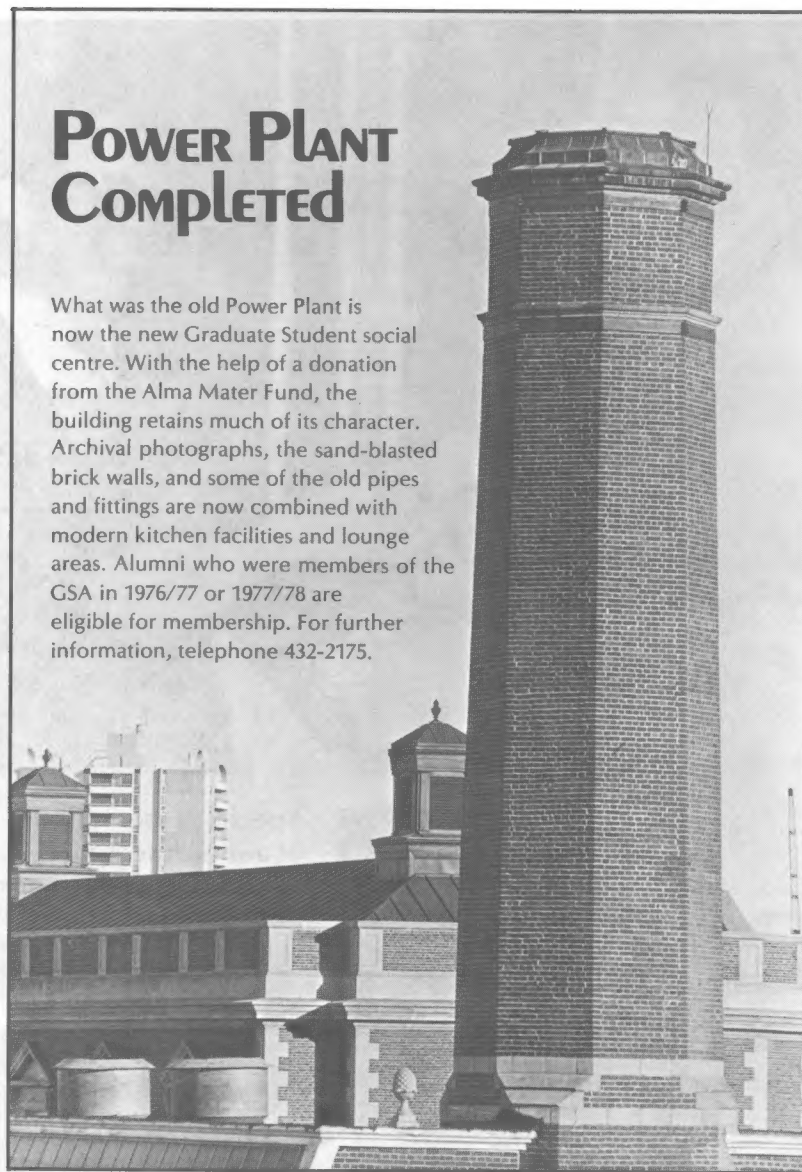
Melvina Gowda, 417, 5520 Riverbend
Road, Edmonton, Alberta T6H 5G9,
(403-436-6480)

Lethbridge

Diana Williams, 610-32 St. South,
Lethbridge, Alberta T1J 3V6,
(403-328-0036)

POWER PLANT Completed

What was the old Power Plant is now the new Graduate Student social centre. With the help of a donation from the Alma Mater Fund, the building retains much of its character. Archival photographs, the sand-blasted brick walls, and some of the old pipes and fittings are now combined with modern kitchen facilities and lounge areas. Alumni who were members of the CSA in 1976/77 or 1977/78 are eligible for membership. For further information, telephone 432-2175.



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